What is Claimed is:

1. A nano-structured metal-carbon composite for an electrode catalyst of a fuel cell, characterized in that metal is impregnated in mesoporous carbon through a chemical bond with carbon.

2. The nano-structured metal-carbon composite according to claim 1, wherein the metal is multi-dispersed regularly and 2 or 3-dimensionally in the mesoporous carbon at an interval of not more than 1 nanometer.

3. The nano-structured metal-carbon composite according to claim 1, wherein the metal is selected from the group consisting of Pt, Ru, Cu, Ni, Mn, Co, W, Fe, Ir, Rh, Ag, Au, Os, Cr, Mo, V, Pd, Ti, Zr, Zn, B, Al, Ga, Sn, Pb, Sb, Se, Te, Cs, Rb, Mg, Sr, Ce, Pr, Nd, Sm, Re and mixtures thereof.

4. The nano-structured metal-carbon composite according to claim 1, wherein the metal is contained in an amount ranging from 1 to 95wt% and the carbon is contained in an amount ranging from 5 to 99wt%, based on the gross weight of the metal-carbon composite.

5. The nano-structured metal-carbon composite according to claim 4, wherein the metal is contained in an amount ranging from 4 to 36wt% and the carbon is contained in an amount ranging from 64 to 96wt%, based on the gross weight of the metal-carbon composite.

6. The nano-structured metal-carbon composite according to one of claims 1 to 3, wherein the metal is pure Pt.

7. The nano-structured metal-carbon composite according to one of claims 1 to 3, wherein the metal is an alloy or a mixture of a first metal and a second metal, and the first metal is platinum.

8. The nano-structured metal-carbon composite according to claim 7, wherein the second metal is selected from the group consisting of Ru, Cu, Ni, Mn, Co, W, Fe, Ir, Rh, Ag, Au, Os, Cr, Mo, V, Pd, Ti, Zr, Zn, B, Al, Ga, Sn, Pb, Sb, Se, Te, Cs, Rb, Mg, Sr, Ce, Pr, Nd, Sm, Re, mixtures or alloys thereof.

9. The nano-structured metal-carbon composite according to claim 7, wherein the atom ratio of the second metal : the first metal is 4 : 96 ~ 75 : 25.

10. The fuel cell characterized in that an electrode coated with the catalyst described in claim 1 is adopted as a cathode.

11. The fuel cell according to claim 10, wherein the fuel cell uses hydrogen or hydrocarbon as a fuel.

12. The fuel cell according to claim 10, wherein the fuel cell is a Direct Methanol Fuel Cell.

13. The fuel cell according to claim 10, wherein a cathode includes a

substrate which is a gaseous diffusion layer using a carbon paper, and a catalyst described in claim 1 as an electrode catalyst,

an anode includes a substrate which is a gaseous diffusion layer using a carbon paper, and an alloy catalyst whose main element is platinum as an electrode catalyst, and

an ion exchange membrane is cationic conductive electrolyte.

14. A process for preparing a nano-structured metal-carbon composite for an electrode catalyst of a fuel cell, comprising the steps of:

(a) preparing a nano template;

(b) adding the nano template in metal precursor solution to impregnate a metal in the nano template and dehydrate the nano template;

(c) adding the nano template impregnated with the metal in carbon precursor solution and mixing them uniformly;

(d) reacting the resultant mixture at high temperature;

(e) carbonizing the resultant reacted mixture; and

(f) removing the nano template from the resultant carbonized mixture.

15. The process according to claim 14, wherein the nano template is selected from silica, alumina or mixtures thereof.

16. The process according to claim 15, wherein the nano template is a silica type.

17. The process according to claim 14, wherein the step (d) is performed at a temperature ranging from 60 to 350°C, and the step (e) is performed at a temperature

ranging from 800 to 1000°C.

18. The process according to claim 14, wherein the carbon precursor is selected from the group consisting of furfuryl alcohol, glucose and sucrose.

19. The process according to claim 18, wherein the carbon precursor is sucrose.

20. The process according to claim 14, wherein the carbon precursor is selected from the group consisting of a alcohol compound including a phenyl ring, a polar compound including an olefin group and an alpha olefin compound.

21. The process according to claim 20, wherein the carbon precursor is selected from the group consisting of phenol, acrylonitrile and propylene.

22. A nano-structured metal-carbon composite for an electrode catalyst of a fuel cell, fabricated by the process described in claim 14.